



Wisconsin's Great Lakes Restoration and Protection Strategy

2006

COUNCIL OF GREAT LAKES GOVERNORS' PRIORITIES

1. AQUATIC INVASIVE SPECIES

Council of Great Lakes Governors' Priority: Stop the introduction and spread of non-native aquatic invasive species.

2. HABITAT AND SPECIES

Council of Great Lakes Governors' Priority: Enhance fish and wildlife by restoring and protecting coastal wetlands, fish and wildlife habitats.

3. COASTAL HEALTH

Council of Great Lakes Governors Priority: "Promote programs to protect human health against adverse effects of pollution in the Great Lakes ecosystem."

4. AREAS OF CONCERN/CONTAMINATED SEDIMENTS

Council of Great Lakes Governors' Priority: "Restore to environmental health the Areas of Concern (AOC) identified by the International Joint Commission as needing remediation."

5. NONPOINT SOURCE MANAGEMENT

Council of Great Lakes Governors' Priority: Control pollution from diffuse sources into water, land and air.

6. PERSISTENT BIOACCUMULATIVE TOXINS (PBT)

Council of Great Lakes Governors' Priority: "Continue to reduce the introduction of PBTs into the Great Lakes ecosystem."

7. SUSTAINABLE DEVELOPMENT

Council of Great Lakes Governors' Priority: "Adopt sustainable use practices that protect environmental resources and may enhance the recreational and commercial value of our Great Lakes."

8. INFORMATION AND INDICATORS (I&I)

Great Lakes Governors' Priority: "Standardize and enhance the methods by which information is collected, recorded and shared within the region."

Wisconsin Great Lakes Restoration And Protection Strategy

EXECUTIVE SUMMARY

The Great Lakes contain 20% of the world's fresh surface water supply. Because of that, the Great Lakes are critical to the health and welfare of all the Great Lakes states but especially for us here in Wisconsin. They provide drinking water for millions of state residents. They support manufacturing and recreational industries providing 100,000s of jobs. They generate power and assimilate our wastewaters. But most importantly they define and support a huge freshwater system and related terrestrial ecosystem which is unique in the world. Effective management of both water quantity and water quality is necessary if we are to fulfill our state's stewardship obligations for these world class resources. This strategy is the first step in defining the actions needed to ensure that our Great Lakes are protected and where needed restored to sustain this system for future generations.

Over the past 20 years, a variety of planning efforts have attempted to develop remedies that would restore portions the ecological integrity of the Great Lakes systems. These planning efforts have often focused on a single problem, a single desire or a small geographic region. What has been lacking is a comprehensive action agenda for restoring our Great Lakes: an agenda that fully represents the needs and desires of the State of Wisconsin. In this strategy, we have brought together information from the various past planning efforts to build a comprehensive state action agenda. This strategy is the first stage of an iterative process-a process to bring people together from across the state, much like the Regional Collaboration brought interests from Minnesota to New York together around a common agenda.

The DNR Office of Great Lakes with the help of countless individuals and organizations developed the initial proposals for a Wisconsin Great Lakes Strategy to parallel the Council of Great Lakes Governors' (CGLG) Priorities for the Great Lakes (<http://www.cglg.org/projects/priorities/index.asp>). These priorities were also the organizational framework for the Great Lakes Regional Collaboration (<http://www.glrc.us/>).

The Great Lakes Regional Collaboration process started in May 2004 with the issuance of an executive order from President Bush. The executive order called for improved federal coordination and efficiency of Great Lakes programs and for the EPA Administration to initiate "a regional collaboration of national significance" to create a national action agenda for Great Lakes. In December 2004 the collaboration started under the direction of five organizational partners: the eight Governors through the council of Great Lakes Governors, the federal agencies through the inter-agency task force, tribal governments, the organization of the Great Lakes Mayors, and the Great Lakes congressional organization. Because this regional collaboration reflects the needs of five lakes and eight states, recommended actions are framed by common but

somewhat generic issues. As an example, restoration of self-sustaining stocks of native fish species is an issue which transcends the eight states. Yet the species may differ from state to state or lake to lake: brook trout in Lake Superior versus lake trout in Lake Ontario.

Each chapter in this document begins with a **Problem** statement related to the specific topic area *as it relates to the status in the Wisconsin portion of the Great Lakes basin*. This is followed by a section on **Goals** for achieving long term success in the basin. The **Recommended Actions** section articulates near term actions to help address the problems identified in the first section.

We have several goals for our initial Wisconsin Great Lakes Strategy:

1. the strategy will translate the recommendations from the regional collaboration into Wisconsin specific actions
2. the strategy will be a vehicle for coordinating efforts and developing shared priorities,
3. the strategy will serve as a menu for securing and allocating resources, and
4. the strategy will promote developing projects to be ready for implementation and better position Wisconsin for competing for federal restoration and protection funding

As stated above, this is an initial strategy. We fully expect it to evolve change as more information is collected or as issues change. It is our intent to update this strategy through a process of public reporting, solicitations of ideas and comments and reacting to what we learn in an adaptive approach. Our current thoughts are that a state of the lakes report would be developed biennially and presented in public forum. These sessions and other information would then be the basis for a more formal review and revision of the strategy.

AQUATIC INVASIVE SPECIES

Council of Great Lakes Governors' Priority: Stop the introduction and spread of non-native aquatic invasive species.

PROBLEM STATEMENT

Aquatic invasive species (AIS) are increasingly recognized as a serious problem in Wisconsin. Both intentional and unintentional releases of exotic species pose serious threats to the health, economic welfare and ecological integrity of Wisconsin. Particularly problematic is preventing new introductions of AIS into Wisconsin waters and controlling the spread of existing AIS between waterbodies. Prevention and control strategies rely heavily on information, education and outreach activities. But watercraft inspection efforts, monitoring, research and policy and legislative initiatives are also very important.

The key to preventing new AIS introductions is control the transport mechanisms or pathways of release of AIS into Lakes Michigan and Superior and inland state waters. The highest prevention priority is the control of ballast water discharges. Other vectors of transport also need to be addressed including: the transportation and rearing systems related to the aquaculture industry, commercial barge traffic, recreational boating, the sale and distribution of fishing bait, the transfer and disposal of aquarium pets, plant nurseries, fish stocking activities, live fish markets and individual releases by anglers.

GOALS

Wisconsin's goal for aquatic invasive species management is, to the maximum extent possible, prevent any new introductions of nuisance exotic species and prevent any new introduced nuisance exotic species from becoming naturalized or spreading to new areas.

RECOMMENDED ACTIONS

GLRC Recommendations: Ship and barge-mediated introductions and spread of AIS in the Great Lakes should be eliminated, through the immediate promulgation of environmentally protective standards for ballast water, and the implementation of effective ship-board treatments and management measures.

Wisconsin Strategy: Develop and implement a regulatory permitting system which ensures that ballast waters are adequately treated prior to discharge to waters of Wisconsin.

GLRC Recommendations: Federal, state, and/or local governments must enact measures that ensure the region's canals and waterways are not a vector for AIS, including full federal funding of the Chicago San-Ship Canal barrier and the sea lamprey control program.

Wisconsin Strategy: Develop a better understanding of the various pathways in which aquatic invasive species become introduced in Wisconsin waters. Continue support for the Aquatic Invasive Species Specialist position, who works with the aquaculture, aquarium, bait, and rain garden industries. For example, by working with local bait shops, determine if bait are collected from invested waters or brought in from outside

the State. This information would help develop guidance for the bait industry in understanding how they can help address the problem. Wisconsin will also participate through the Council of Great Lakes Governors in the regional effort to secure funding to complete construction and provide for long term operation of the barriers in the Chicago Ship Canal.

GLRC Recommendations: Establish a Great Lakes Aquatic Invasive Species Integrated Management Program to implement rapid response, control, and management programs and assess the effectiveness of those programs.

Wisconsin Strategy: Wisconsin has an aquatic species plan in place and other efforts are underway in conjunction with the Governor's council on Exotic Species.

HABITAT AND SPECIES

Council of Great Lakes Governors' Priority: Enhance fish and wildlife by restoring and protecting coastal wetlands, fish and wildlife habitats.

PROBLEM STATEMENT

Both habitat quantity and quality in the State have decreased through human activities. These reductions currently limit chances for existing programs to restore species to self-sustaining levels in Wisconsin. Priority areas for protection and restoration identified in the regional collaboration are wetlands and tributary streams.

Historic activities have altered regional hydrologic patterns resulting in changes to flood peaks and periods and low flow volumes and duration. Riparian habitats have also been lost. Together, these and other land uses have resulted in changes in stream morphology with reduced amounts of high quality habitat for fish and wildlife. Species restoration plans are dependent on habitat quality and the anadromous fishes are dependent on tributaries for spawning and nursery areas. With much of the riparian ownership in private hands, educational efforts and incentive programs are needed to acquire or restore critical tributary stream riparian zones. Riparian buffer development and wetland restoration are key steps in restoring tributary habitat quality. Management of storm water flows to optimize infiltration and decrease run-off rates are also important restoration projects. Key tools for implementing these measures are the wetland reserve program and the conservation enhancement reserve program.

Other habitat issues in the Great Lakes basin include those related to isolated island habitats and dunes and shorelines, and other species specific needs like forest openings or shrublands for sharp tail grouse. Associated grasslands acreage goals for waterfowl nesting and songbird habitats have also been identified in east central Wisconsin. Roughly 30,000 acres for restoration and protection are proposed for the Lake Michigan basin. Maintain 260 pair of Foresters Terns and 100 pair of Common terns on the Winnebago pool lakes. Increase diving duck use days of Lake Winnebago to 500,000 and increase dabbling duck production by 500%. Protect Green Island Black Crowned Night Heron rookery. State natural areas, state forests, state parks and refuges national parks, shorelines and refuges all may be priority sites for protection, restoration and maintenance actions to prevent or correct degradation or other threats influencing loss of native species. Other sites include the Wolf River hardwood bottoms, sites along the Niagara escarpment, specific shoreline dunes or wetlands and remnant native habitat sites like prairies, savannahs, beech or hemlock populations and a variety of native plant and animal species listed as either threatened or endangered. Some specific sites or priority sites are state natural areas with associated buffers and 2000 acres of forested wetlands and related other wetlands in the Wolf River basin.

Other issues which have been raised around the state are cormorant population/fish population relationships, yellow perch population fluctuations, unique geologic sites, forest cover/tributary stream hydrology relationships, near shore habitats and cladophora.

GOALS

Wisconsin's goal for habitat and species is to rely on existing species recovery or management plans and strategies to identify critical habitat and species needs and to protect and restore those habitats which are critical to meeting recovery targets.

Examples of priority management targets are:

- Lake sturgeon
- Musky in Green Bay
- Tern populations
- Brook trout in Lake Superior
- Walleye
- Trumpeter Swans
- Increasing breeding pairs of waterfowl
- Species of Greatest Conservation Need
- Species of Concern

RECOMMENDED ACTIONS

GLRC Recommendation on Open and Nearshore Waters: Develop and evaluate lake trout restoration efforts through strategies such as a 40 percent increase in the number of lake trout stocked, using guidance from existing fishery management plans.

Wisconsin Strategy: Continue to support the fish refugees: Gull Island Refuge (1976) and Devils Island Refuge (1981). Gull Island Reef is one of the few places where a remnant lake trout spawning population survived the lamprey invasion.

GLRC Recommendation for Riverine Habitats and Related Riparian Areas: Restore ten Great Lakes tributaries (five tributary barrier projects and five riparian habitat projects).

Wisconsin Strategy: Restore 8 Great Lakes tributaries. The following rivers and streams represent priority areas for protection and restoration within the Wisconsin portion of the Great Lakes Basin. Projects are intended to serve as recommendations for focused restoration efforts that will move us toward the stated goals:

Lake Superior Basin Projects	
Brule River	
Bark River	
Fish Creek	
Flag	
Sioux	
Cranberry	
Iron	

Lake Michigan Basin	
Wolf River	
Manitowoc River	
Peshtigo River	
Kewaunee River	
Fox River	
Stoney Brook	
Milwaukee River	

GLRC Recommendations for Wetlands: Restore or protect 200,000 acres of wetlands and associated uplands.

Wisconsin Strategy: Restore or protect 200,000 acres of wetlands and associated uplands in Wisconsin. This includes 7000 wetland acres on the west shore of Green Bay for birds. Increased habitats for northern pike spawning have also been identified as a critical need for fisheries habitat. Other key efforts are the protection and restoration of coastal wetlands to restore regional hydrology and adjacent habitats.

Adopt target areas for priority actions that are identified in the North American Waterfowl Plan and the related Joint Venture for wetland acreage increase goals in the Lake Superior basin, the west shore of Green Bay, and the Milwaukee River basin.

COASTAL HEALTH

Council of Great Lakes Governors Priority: "Promote programs to protect human health against adverse effects of pollution in the Great Lakes ecosystem."

PROBLEM STATEMENT

Beaches:

Wisconsin is blessed with beautiful beaches on both Lake Michigan and Lake Superior shorelines. Unfortunately, recent monitoring has resulted in beach closures due to bacterial counts exceeding standards. On Lake Michigan beaches, an algae problem which had largely disappeared has reemerged. Cladophora now fouls beaches along the entire shoreline. Nonpoint sources and inadequately treated wastes are causing nutrient enrichment of the nearshore waters. Both urban and rural nonpoint sources are contributing a wide variety of pollutants which are collected by the tributaries and discharged into the lakes. Currently federal law requires that beaches be posted advising of health risk if the E. coli levels in a single sample exceed 235 cfu/100 ml. Over the past three years water quality samples from Wisconsin's beaches have exceeded this threshold 15% of the time in 2003, 22% in 2004, and 16% in 2005. The percentage of beaches with 90% compliance of water quality standards was 53 % in 2003, 39 % in 2004 and 53 % in 2005. . The algae presence may also contribute to beach closures by providing a suitable environment for E. coli to survive and even grow.

Sources of Pathogens to the Great Lakes

Potential sources of pathogens impacting recreational water and drinking water in Lakes Michigan and Superior are the result of both direct and indirect contamination sources. Research by local communities has found that primary sources of contamination vary widely by beach and that most sources are local in nature. Sources of concern include:

- Storm water discharge from nearby outfalls
- Direct runoff from roads and parking lots
- Storm events that cause domestic and wild animal waste to wash into waterways
- Malfunctioning septic systems
- Illegal sewer connections to streams that present a source of human derived bacterial contamination
- Avian and other animal populations on beaches
- Sanitary and combined sewer overflows

GOALS

Wisconsin's goal for coastal health is to protect public health through elimination of pollution sources which can cause bacterial closings at beaches.

RECOMMENDED ACTIONS

GLRC Recommendation: Eliminate to the extent provided by existing regulation inputs of untreated or inadequately treated human and industrial waste to Great Lakes basin waters through implementation of wet weather programs, including improvements to wastewater treatments systems.

Wisconsin Strategy: Working with local agencies, identify and correct sources of pathogens which are resulting in beach closures. Continue investigation of causes and solutions for Cladophora problems.

Key Locations:

Beaches, that are rank as high priority beaches, are those that have been out of compliance more that 10% of the time in the past three years. The Recreational Public Health and Welfare Use Assessment Team will be prioritizing beaches in need.

Key beaches that need attention are:

County	Beach Name
Milwaukee	Bradley
	South Shore
	McKinley
Door	Sunset
	Sturgeon Bay
Ozaukee	Kohler Andrea State Park
	County Road D Boat Launch
	Cedar Beach
	Harrington State Park

GLRC Recommendation: Standardize, test, and implement a risk-based approach to manage recreational water.

Wisconsin Strategy: Provide short term guidance on nuisance algae beach clean up and provide public information covering the following topics through local signage ordinances:

- Bacteria are present in natural waters (in quantities that may or may not cause a health problem)
- Feeding waterfowl can increase avian waste at beaches
- Observing sanitary measure such as hand washing and staying out the water with gastrointestinal illness to limit exposure
- Information on what the risk for illness is when there is a beach closure.
- Promote proper boat waste disposal

GLRC Recommendation: Protect drinking source water quality.

Wisconsin Strategy: Fund wellhead protection plans and replace existing water quality testing methodologies with real time testing methodologies. Complete environmental inventories of both emerging pathogens and other pollutants that are comprehensive and include watersheds, wastewater inputs and drinking water withdrawals. From this inventory the sources, fates, and reduction strategies for these items of concern can be evaluated. Implement a strategy to monitor emerging contaminant such as those on the Wisconsin Watch List, pharmaceuticals and personal care products.

AREAS OF CONCERN/CONTAMINATED SEDIMENTS

Council of Great Lakes Governors' Priority: "Restore to environmental health the Areas of Concern (AOC) identified by the International Joint Commission as needing remediation."

PROBLEM STATEMENT

Great Lakes Areas of Concern (AOCs) are severely degraded areas within the Great Lakes Basin whose beneficial uses are impaired because of changes to the physical, chemical, or biological integrity of the system. The four major categories of Beneficial Use Impairments (BUIs) are contaminated sediments, habitat loss or destruction, nonpoint source pollution, and beach issues. The Great Lakes Regional Collaboration (GLRC) AOC/Sediments strategy team addressed three primary barriers to making further progress in restoring the Areas of Concern (AOCs): AOCs program administration, lack of delisting targets, and contaminated sediments.

The Great Lakes Water Quality Agreement, via a 1987 amendment, directed the U.S. and Canadian governments to develop and implement Remedial Action Plans (RAPs) for each Area of Concern. Stage I Remedial Action Plans (RAPs) and updates or Stage II Remedial Action Plans have been prepared for each of the five Wisconsin AOCs. However the AOC/RAP program effort in Wisconsin scaled back considerably in the late 1990s with the reduction in federal funding. DNR discontinued staffing for local Remedial Action Plan (RAP) teams and RAP updates have not been produced since 1996.

Statewide or site-specific delisting criteria or targets, against which to measure progress and completion, are necessary for delisting AOCs or individual use impairments. Although progress has been achieved toward restoration of beneficial uses in all of the AOCs, none of the sites have been restored sufficiently or evaluated sufficiently to be delisted. The St. Louis River Citizens Action Committee drafted delisting targets for the St. Louis River AOC, and is awaiting DNR and EPA review, comment and approval. None of the other Wisconsin AOCs have delisting criteria or targets developed. Milwaukee will be pursuing a 2-year project to refine Beneficial Use Impairments (BUIs) and set preliminary delisting criteria tailored to the different areas within the AOC.

Five Wisconsin harbor and river mouth areas have serious pollution problems that severely limit the beneficial uses of the waterways. These water bodies were designated “Areas of Concern” (AOC,) as defined by the Great Lakes Water Quality Agreement, in the mid-1980s. They were identified based on 14 beneficial use impairments (BUIs), which are broadly categorized as contaminated sediments, habitat loss or destruction, non point pollution and beach issues. A full listing of the 14 BUIs is presented in Table 1 of Appendix A.



AOC - Contaminated Sediment Focus

Many of the sources that impact the AOCs are addressed in the other priorities of the Great Lakes Regional Collaboration (GLRC) and in turn, will be so addressed in Wisconsin's parallel Great Lakes strategy. Like the Regional Collaboration process, the Wisconsin strategy will largely focus on contaminated sediments. The contaminated sediment problem is linked to multiple use impairments in every one of Wisconsin's AOCs.

Currently, a contaminated sediment management strategy exists in the 1994 Milwaukee Estuary RAP and a sediment quality management plan focusing on PAH contamination is under development for the lower St. Louis River AOC. All of the AOCs, including the two above, as well as Sheboygan, Menominee and Green Bay have some contaminated sediment deposits that are being addressed under Superfund or RCRA authorities. The strategies associated with those programs have been or can be incorporated in the RAPs for the latter three sites as Stage II sediment remediation recommendations.

Legacy Act – The GLRC is recommending the Legacy Act be amended and reauthorized, then “be the primary authority used to address contaminated sediment in the AOCs”. Proposals for sediment projects located within four of the five Wisconsin AOCs have been submitted for Legacy Act funding, as follows:

Area of Concern	Project Title	Applicant
St. Louis River - MN	St. Louis River/Interlake/Duluth Tar Site Remediation	GKN North America Services, Inc.
St. Louis River – WI	Hog Island Inlet – Newton Creek, Segment L Contaminated Sediment Remediation	Wisconsin DNR
Sheboygan River	Upper Sheboygan River Environmental Dredging	Pollution Risk Services
Menominee River	Former Manufacture Gas Plant Site, Marinette, WI (PROPOSAL WITHDRAWN)	Wisconsin Public Service Corporation
Milwaukee Estuary	Restoration of the Kinnickinnic River, Milwaukee, Wisconsin	Wisconsin DNR

Wisconsin has contaminated sediment sites in numerous areas outside of the AOCs. A contaminated sediment site list was prepared by the DNR's Contaminated Sediments Standing Team. The GLRC recommends sites outside of AOCs proceed to cleanup under other existing remediation authorities. Superfund and/or RCRA or the state's Environmental Repair Fund have been and are being used in the AOCs. These programs are also being used in cleanups in Chequamegon Bay, Manitowoc, and on numerous tributary rivers to the Great Lakes. All programs available, including the Legacy Act, for sediment clean up are complex and process heavy, some taking decades to work through prior to any sediment remediation occurring. This has allowed contamination to impact uses in the AOCs and other sites and spread to the Great Lakes for many decades.



GOALS

Wisconsin's goals for Areas of Concern (AOC) and contaminated sediments are to develop delisting targets for each AOC in Wisconsin and to identify a reasonable timeline for achieving the goal of delisting.

RECOMMENDED ACTIONS

GLRC Recommendation: AOC Program Capacity

Wisconsin Strategy: Revitalize RAP process and engage local communities for each AOC to develop implementation priorities for the actions listed in the RAPs. Bring the issues back to the community using outreach and educational activities, so a well informed and motivated citizenry will help drive the clean-up. Engaged communities that understand the benefits of taking back the river could be deployed to move agencies and responsible parties to action.

GLRC Recommendation: Existing U.S. EPA/State RAP Work Group should be expanded to a Federal-State AOC Coordinating Committee to better coordinate efforts and optimize existing programs and authorities to advance restoration in the AOCs.

Wisconsin Strategy: Participate in the Federal-State AOC Coordinating Committee to ensure Wisconsin needs are addressed.

NONPOINT SOURCE MANAGEMENT

Council of Great Lakes Governors' Priority: Control pollution from diffuse sources into water, land and air.

PROBLEM STATEMENT

Wisconsin continues to experience water quality problems in bays, harbors and nearshore waters of Lake Michigan and in direct tributaries to both Lakes Michigan and Lake Superior. For example:

- "Lower" Green Bay continues to have low dissolved oxygen levels and poor water clarity due to phosphorus and sediment carried by the Fox River and nearby tributaries to the bay. About a 50% reduction in phosphorus and sediment is needed to restore the quality of the bay
- Mats of Cladophora, a stringy algae, is found along Lake Michigan beaches from Door County south to the Illinois border due to phosphorus with some undefined relationship to zebra mussels.
- Beaches along Lake Michigan have closings and use advisories due bacteria, some of which comes from nonpoint sources.
- Streams directly tributary to Lake Michigan have some of the highest phosphorus concentrations of any streams in Wisconsin.
- A number of Lake Superior tributaries important to Lake Superior fish has had fish habitat degraded due to sedimentation caused by high rates of runoff from agricultural lands.

Wisconsin continues to address these needs through a variety of federal, state and local programs. However, to meet these needs in a reasonable amount of time financial, technical and educational assistance need to be increased. Compliance assurance is also needed for implementation of permits and performance standards and prohibitions.

GOALS

Wisconsin's goal for non point management include reducing the amount of phosphorus, sediment and bacteria from urban and rural nonpoint sources, establish 80,000 acres^[1] riparian buffers on agricultural lands along lakes and streams throughout the Great Lakes basin.

RECOMMENDED ACTION

GLRC Recommendation: Between \$77 million and \$188.7 million should be provided annually over five years to fund restoration of 550,000 acres of wetlands

Wisconsin Strategy: Continue to implement and expand wetland restoration through the Wetland Reserve Program.

^[1] Based on an average buffer width of 66 feet and taking into account stream length and land use.

GLRC Recommendation: \$335 million should be provided to restore 335,000 acres of buffers over five years.

Wisconsin Strategy: Work with Natural Resource Conservation Service (NRCS) to expand CREP eligibility to the entire Great Lakes drainage area in Wisconsin and continue and enhance implementation of CREP on cropland and marginal pastureland in eligible area.

GLRC Recommendation: \$120 million should be allocated by 2010 to achieve a 40 percent reduction in soil loss in ten selected watersheds.

Wisconsin Strategy: Continue establishment of grassed waterways and other practices that manage runoff in locations of concentrated flow and implement NR 151 performance standards and prohibitions.

GLRC Recommendation: \$106 million in funding should be provided to support the development and implementation of comprehensive nutrient and manure management on livestock farms.

Wisconsin Strategy: Continue to promote proper residue management that accommodates management of manure to minimize the amount of bacteria in runoff waters. Develop and implement comprehensive phosphorus-based nutrient management plans on all Great Lakes drainage basin farms that are over a certain size (acres).

PERSISTENT BIOACCUMULATIVE TOXINS (PBT)

Council of Great Lakes Governors' Priority: "Continue to reduce the introduction of PBTs into the Great Lakes ecosystem."

PROBLEM STATEMENT

Persistent Bioaccumulative Toxins (PBT) are chemicals that last a long time in the environment. Animals and people accumulate PBTs in their bodies, primarily from the food they eat, but also from inadvertent ingestion and inhalation of soil and dust. PBTs are toxic substances that can cause a wide range of health effects in fish, wildlife, and humans.

WDNR no longer prepares a Toxic Release Inventory (TRI) due to budget cuts.

Wisconsin needs to evaluate releases of PBTs that occur in our state from permitted sources at a minimum, and prepare the TRI for the state

Contaminated Sediments--Contaminated Sediments contain many PBTs that have accumulated in our waterways as a result of soil erosion, non-point source runoff, and direct discharges. Direct discharges are covered under the WPDES permit process but other sources and the lingering effects of sediments contaminated through former discharges provide a continual source of exposure to PBTs. Public awareness and educational efforts through work at Areas of Concern and Remedial Action Plans are addressing contaminated sediments and their cleanup. Other programs, especially the Remediation and Redevelopment Program, work on clean up and rehabilitation of contaminated sites such as manufactured coal gas sites, brownfields, and hazardous waste spills in an effort to remove and keep PBTs out of the environment.

Fish Consumption Advisories ---Mercury and polychlorinated biphenyl (PCBs) are the contaminants of greatest concern in Wisconsin's fish. Currently there are fish advisories for mercury and PCB's for Lakes Michigan and Superior and their tributaries. Some inland waters also have fish contaminated with polychlorinated biphenyl (PCBs). In those waterbodies, anglers should follow the specific consumption advice for PCBs to avoid potential health issues. Specific advice is provided on how many meals you can safely eat of species caught from waters contaminated with PCBs, such as Lakes Michigan and Superior, some large rivers and other surface waters.

The changes in mercury advice resulted from the National Research Council's report, "Toxicological Effects of Methylmercury" (2002). The use of this new reference dose requires that consumption advice be issued when fish exceeded 0.05 parts per million (ppm) mercury. Most of Wisconsin's fish contain at least that amount based on past testing. Thus, consumption advice is appropriate for most fish.

New Chemicals of Concern

With the ever-increasing production of chemicals, more chemicals are likely to be added to the list of PBTs. Currently scientist are looking at potential effects of flame retardants and the massive amounts of pharmaceuticals and personal care compounds that pass through our wastewater treatment systems. As more information becomes available on these compounds, measures may need to be taken to limit exposure to them in the environment.

GOALS

Wisconsin's goal for PBTs is to reduce the amounts of persistent bioaccumulating toxicants in the Great Lakes ecosystem using pollution prevention, hazardous waste collection, waste minimization techniques, recycling, remediation and educational programs. Priority pollutants are those which pose the greatest threats to human health through consumption: mercury, PCB's, pesticides, and other similar contaminants.

RECOMMENDED ACTION

GLRC Recommendation: Protect human health through consistent and easily accessible basin-wide messages on fish consumption and toxic reduction methods and choices.

Wisconsin Strategy: Continue to monitor fish tissue and issue consumption for fish and wildlife to protect public health.

SUSTAINABLE DEVELOPMENT

Council of Great Lakes Governors' Priority: "Adopt sustainable use practices that protect environmental resources and may enhance the recreational and commercial value of our Great Lakes."

PROBLEM STATEMENT

Humans rely on services provided by ecosystems that benefit human societies and economies. This reliance requires that we ensure the ecosystem's ability to recover and restore itself from human use. Sustainable development is a practice that balances economic, societal and ecological needs to "meet the needs of the present without compromising the ability of future generations to meet their own needs." (UN Brundtland Commission 1987). The status of and barriers to sustainable development in Wisconsin are outline below in six categories of ecosystem services: land use and development; agriculture and forestry; transportation; industrial activities; water infrastructure, and recreation, tourism and fishery.

Land Use and Development

Based on the 1991 Wisconsin land cover data, of Wisconsin's 35 million acres of land 2% is developed, 32% is agricultural lands, 11% is grasslands, 39% is forested, 14% is wetlands and 2% is barrens or shrubland. Similar to the rest of the Great Lakes region, Wisconsin is experiencing the impacts of sprawl – low-density disjointed development on previously unbuilt land. For example between 1982 and 1997 the population of the Milwaukee Metropolitan area grew by 6.5 percent while its urbanized areas grew by 24.9 percent and vehicle miles traveled increased by 23 percent.[i] The impacts of urbanization for the Great Lakes include greater areas of impervious surfaces which increases storm water runoff causing flooding and pollution of waterways. In addition, the increase in impervious areas also reduces infiltration that recharges groundwater thereby reducing groundwater discharge to streams. Development of open space can also result in a loss of habitat. [ii]

In 1999 Wisconsin passed comprehensive planning legislation that focuses on public participation in creating a comprehensive plan for local units of government. It required all local government adopt their plans in entirety and to comply with them for land use decisions after 2010. Wisconsin also has several brownfield financial and liability incentive programs to clean up and redevelop abandoned or under used contaminated properties. Since 1998 \$36.9 million has been granted to 89 and resulted in the redevelopment of 1090 acres.

Agriculture and Forestry

A survey of Wisconsin forests was conducted in 1996. This survey found that Wisconsin forests increased by 4% since the last survey in 1983. It also found that timber growth is increasing at a faster rate than is being harvested. Currently about 59% of annual timber growth is harvested, showing that timber harvests are currently at a sustainable rate.

Wisconsin is currently losing prime farmland to development. Particularly in the Lake Michigan basin, with the growing Fox River Corridor and the Milwaukee metropolitan area, farmland is under extreme pressure to be developed. For example between 1992 and 1997 Wisconsin lost 91,000 acres of prime farmland.[iii] Property tax reductions

through use value assessments have help alleviate some of this pressure, however the high property values still exert pressure to develop. Animal waste management continues to be a critical issue in the Lake Michigan basin with increasing number of cows and manure spills. Conservation tillage, stream buffers, wetland restoration, integrated pest management and enrollment in conservation programs directed toward agricultural lands are all efforts to improve reduce soil erosion, improve water quality, reduce pesticide load to the environment and improve habitat. A new federal program, the conservation security program, started in 2004 and provides payments to farmers who practice good stewardship. In the Lake Michigan Basin the Duck-Pensaukee watershed became eligible for this program in 2005. However enrollment is still well below targets.

Transportation

Wisconsin relies heavily on roadways to meet transportation needs, yet this has caused air pollution problems in counties on Lake Michigan. Grant programs to enhance public transportation, bicycle/pedestrian options, ridesharing programs and congestion are available for these counties. A requirement for gas reformulation has reduced the frequency of high ozone levels. A high speed rail line has been proposed by Amtrak to connect Chicago, Milwaukee, Madison, and Minneapolis. An aging transportation infrastructure impedes intermodal systems. Shipping is another major economic factor for Wisconsin with 15 commercial ports that handle over 40 million tons of cargo annually. Aged water and wastewater infrastructure are unable to handle current demands and could pose a financial burden to communities in the near future.

GOALS

Wisconsin's goal for sustainable development is that a vibrant sustainable economy and a healthy ecosystem co-exist and synergistically support each other.

RECOMMENDED ACTIONS

GLRC Recommendation: Adapt and maintain programs that promote sustainability across all sectors

Wisconsin Strategy: Work with the State Department of Tourism to promote certification of green tourism businesses.

GLRC Recommendation: Align governance to enhance sustainable planning and management of resources.

Wisconsin Strategy: Support the use of a portion of funding from new federal Great Lakes cleanup dollars for waterfront revitalization of Great Lakes brownfields in Wisconsin communities. Support funding of state brownfield grant and loan programs, including the Brownfield Site Assessment Grants (DNR), Green Space and Public Facilities Grants (DNR) and Commerce Brownfield Grants and support funding of the federal brownfield grant and loan programs and tax incentives, as well as other related funding (e.g. Community Development Block Grants and Coastal Management/Restoration Grants).

GLRC Recommendation: Build outreach that brands the Great Lakes as an exceptional, healthy, and competitive place to live, work, invest, and play

Wisconsin Strategy: Work with the State Department of Tourism to promote certification of green tourism businesses. The Travel Green Wisconsin is a voluntary, affordable program that reviews, certifies, and recognizes tourism businesses that have made a commitment to continuously improve their operations in order to reduce their environmental and social impact. This program helps businesses evaluate their operations, set goals and take specific actions towards environmental, social and economic sustainability.

INFORMATION AND INDICATORS (I&I)

Great Lakes Governors' Priority: "Standardize and enhance the methods by which information is collected, recorded and shared within the region."

PROBLEM STATEMENT

INFORMATION

There are numerous organizations, governmental agencies, and researchers studying the Great Lakes and its tributaries and surrounding landscape. Although technology trends are moving towards a more open environment, Wisconsin still lacks an efficient or comprehensive system for discovering and accessing data on the Great Lakes. The Wisconsin Land Information Program (WLIP), which started in 1990 to advance land information programs across the State, has been instrumental in building GIS and information technology capacity at the county and local level. While Wisconsin stands out among other states in utilizing geo-spatial data, restrictive data sharing policies hamper efficient and timely access to the information. The National Spatial Data Infrastructure concept and associated federal agency initiatives, such as the National Map and Geospatial Onestop Portal, provide a framework for data access and integration and the geospatial industry and public agencies have joined efforts to advance a variety of tools and standards such as Open Geospatial Consortium standards to facilitate data discovery and data integration. However these have yet to be fully utilized within the State.

Long term trends analyses, one important tool for determining the health of the Lakes, depend on consistent and compatible data being collected over the entire geographic extent of the Great Lakes basins. Yet specific study objectives and funding criteria can prevent agreement on specific sampling protocols or compliance with content standards. This is compounded with the lack of adequate funding which continues to strain existing monitoring programs.

Standards should be promoted and adhered to across the spectrum of data management activities to ensure compatibility across jurisdictional boundaries. EPA's Environmental Sampling Analysis and Results (ESAR) Standards were developed by the Environmental Data Standards Council (EDSC), a partnership among EPA, States, and Tribes to promote the efficient sharing of environmental information through the cooperative development of data standards. These standards, when final, are intended to serve as a foundation for information exchange across environmental media and currently serve as the basis for EPA Office of Water's pilot project to exchange water quality monitoring data via the Exchange Network. Several database projects within the DNR's Division of Water are implementing these protocols for reporting data to EPA.

INDICATORS

Indicators provide information on the state of the Great Lakes ecological health and provide a measurement of the impacts of human activities on the resources. The State of the Lakes Ecosystem Conference (SOLEC) began addressing environmental indicators in 1994 with emphasis on aquatic community health, human health, aquatic habitat, toxic contaminants and nutrients in the waters, and the changing Great Lakes economy. Since 1998, reports for over 50 indicators have been prepared and presented at the

biennial SOLEC meetings. A study in 1994 found that the WiDNR is involved with monitoring 19 SOLEC indicators in the Great Lakes Basins at varying levels. The WiDNR currently maintains several statewide database management systems (DBMS). These include EPA's STORET system, Fish & Habitat DBMS, Toxic Fish and Contaminated Sediment DBMS, and the Waterbody Assessment Display and Reporting System DBMS. The Department is also developing the Surface Water Monitoring System DBMS, which will store monitoring data that is collected by DNR staff on the surface waters of the state including information on the presence/absence of aquatic invasive species. Other DNR programs collect much needed information such as mercury deposition data monitored by the Air Program.

USGS has considerable water quantity, water quality, and biology information available in their electronic databases. Additionally, they maintain one of WiDNR's biology databases. Linking these databases together however is still a challenge.

The Great Lakes Commission convened the Great Lakes Coastal Wetlands Consortium to expand the monitoring and reporting capabilities on Great Lakes coastal wetlands of the U.S. and Canada under the Great Lakes Water Quality Agreement. The Great Lakes Commission is also leading development of an integrated Great Lakes Observing System (GLOS) to provide critical real-time data for multiple users, including, among others, resource managers, researchers, homeland security interests, the commercial shipping industry and the recreational boating community. GLOS will be a regional node of NOAA's multi-year, national Integrated Ocean Observing System (IOOS) initiative.

However acceptance of indicators across the Great Lakes basins has been slow despite these efforts. Researchers with the Great Lakes Environmental Indicators Project have developed an integrated set of environmental indicators that can be used to assess the condition of the coastal margins of all five Great Lakes. Their work could help bridge the gap between the process of developing indicators and applying them through the activities in the monitoring community.

The lack of baseline information to better define the tributary and GW indicators data set as well as the nearshore areas has hampered assessment of the ecosystem components. We also need protocols or a mechanism for better integrated land (GL watershed-based) data with open water observations. Indicators play a key role in tracking progress toward achieving Remedial Action Plan (RAP) goals and highlight problems that require further management.[2]

Currently monitoring is performed at a variety of levels all the way from federal to local and volunteer organizations but there is little effort to coordinate these activities much less ensure compatibility. Shrinking budgets and the need for rapid response during disasters will require a more comprehensive and coordinated approach to monitoring and data collection/data distribution across the basin. Development of a standardized baseline of information would help promote integration across jurisdictions.

^[2] Great Lake Environmental Indicators Project Report; June 2004, Talbot, Linda WiDNR

GOALS

Wisconsin's goal for Indicators and Information is for policy makers and resource managers to have easy access to comprehensive, up-to-date data in order to assess the condition of the Great Lakes ecosystems. Whether the issue is determining the source of E-coli on beaches, evaluating impacts of new pharmaceuticals in the environment, or planning for wildlife habitat restoration, the data used would be standardized and readily available. Other goals include:

- Data custodians across the state promote open access and sharing of information
- There is sufficient biological information on sturgeon/dynamics to effectively manage these species on a statewide or watershed basis. All aspects of target populations must be adequately assessed if this species is to be effectively managed in the future.
- A full range of indicators are developed and broadly understood across the basin. Indicators are important for assessing the status of the Lakes.
- Data are collected in a fashion that supports this assessment regardless of jurisdictional boundaries such as counties and states.
- Data standards are fully developed and adopted by all entities responsible for collecting data.
- Monitoring activities are coordinated across the basin and are sufficient to address the needs of the scientific and regulatory community.

RECOMMENDED ACTIONS

GLRC Recommendation: To provide accurate, complete and consistent information, the Great Lakes region must increase and better coordinate the collection of critical information regarding the Great Lakes ecosystem. The Great Lakes Interagency Task Force and other stakeholders, needed to implement the U.S. contribution to the Integrated Earth Observation System and the Integrated Ocean Observing System as part of the Global Earth Observing System of System. Monitoring must be better coordinated through the existing Great Lakes management entities, both at a lake-wide and region-wide basis.

Wisconsin Strategy: Assist in convening an annual meeting to present monitoring results in a public forum using existing Great Lakes' partnership groups.

GLRC recommendation: Promote the continued development and implementation of science-based indicators, including implementation of indicators developed through the SOLEC process.

Wisconsin strategy: Work with WI DNR Great Lakes Monitoring team leader to evaluate monitoring protocols established through the WI DNR Water Division's Monitoring Strategy to determine if the SOLEC indicators are addressed sufficiently.

GLRC recommendation: The Great Lakes Interagency Task Force and all regional partners should augment the regional information management infrastructure (i.e. establish a network of networks), adopt standardized data management protocols and commit to open data availability.

Wisconsin Strategy: Support State Cartographer Office activities in clearinghouse and metadata and implement interoperability standards beginning at the state agency level. The recent hire of the State Geographic Information Officer (GIO) should help facilitate state agencies in establishing protocols that promote data sharing and data access. Continue to push for implementation of open source standards across governmental agencies and web based data access tools.

[i] GHK International Ltd. 2003. Forecast and Analysis of Urban Development in the Great Lakes Basin. Final Report Prepared for the Great Lakes Regional Office of the International Joint Commission.

[ii] Wang, L.Z, J. Lyons, P.Kanehl, and R. Bannerman. 2001. Impacts of urbanization on stream habitat and fish across multiple spatial scales. *Environmental Management* 28(2): 255-266.

[iii] National Resources Inventory, 1997 <http://www.nrcs.usda.gov/technical/NRI/>